

WO 00/15163

PCT/SE99/01608

HALLUX VALGUS BRACEField of the invention

The present invention relates to a hallux valgus brace, i.e. a brace designed  
5 for treatment of non-rigid hallux valgus. The complete brace is positioned in front  
of the metatarsal joint and can be used during walking and other activities.

State of the art

Hallux valgus is a painful malposition of the big toe, where the big toe turns  
10 towards the other toes and a bunion is formed on the protruding joint, i.e. the first  
metatarsal joint. This deformity has been treated in the past mainly by means of  
night splints or braces. The brace is mainly used during sleeping or resting. The  
brace uses three pressure points, two of which are located at the metatarsus. Thus,  
the prior art brace requires support proximal of the metatarsal joint. The brace  
15 bridges the metatarsal joint resulting in that the brace is not suitable for walking  
because the bending of the joint together with the brace is not comfortable or even  
impossible.

The present invention solves this problem by positioning the complete brace  
distally of the metatarsal joint. Thus, all components of the brace are located  
20 distally of the metatarsal joint and the brace is not affected by the bending of the  
joint during walking and other activities. In this way, the brace of the invention  
may be used for conservative dynamic treatment of non-rigid hallux valgus. In  
other words, the patient may wear the brace practically at all times resulting in an  
efficient treatment.

Summary of the invention

Thus, the present invention provides a hallux valgus brace comprising a  
three point lever means for correcting the position of the big toe.

According to the invention the complete brace is designed to be located  
30 distally of the metatarsal joint. Preferably, the brace comprises a proximal pad  
pressing on the medial side on the first phalanx of the big toe, a distal pad pressing  
on the distal end of the first phalanx, and a lever arm pressing on the ball of the  
foot.

The invention is defined in claim 1 while preferred embodiments are set  
35 forth in the dependent claims.

Brief description of the drawings

The invention will be described in detail below with reference to the accom-  
panying drawings in which:

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27-03-2000

figure 1 is a bottom view of the brace on the foot of a patient;  
figure 2 is a detail view of one component of the brace carrying the distal  
pad;  
figure 3 is a detail view of the main part of the brace; and  
figure 4 is a bottom view of the complete brace according to the invention.

### Detailed description of preferred embodiments

The hallux valgus brace according to the invention is now described with reference to the drawings. In figure 1, the brace is shown as worn by a patient on a foot. The skeletal bones of the foot are shown for reference. In figure 4, the complete brace 1 is shown by itself. The brace is located in the space which exists under the normally slightly bent toes. At the medial side the brace carries a proximal pad 2 pressing on the first phalanx of the big toe. A distal pad 3 is carried by an adjustable arm 5 and presses on the distal end of the big toe, preferably on the distal end of the first phalanx.

The pads 2 and 3 are connected to the frame of the brace by means of hinges, so that the pads can turn and adapt themselves to the curvature of the contact area between the pads and the toe. Thus, the pads 2 and 3 are self-adjusting for better fit and comfort.

The lateral part of the brace comprises a lever arm 4 pressing backwards and acting as a counterforce on the ball of the foot. The lever arm 4 also carries a strap 8, best shown in figures 3 and 4. Another toe is inserted through the strap 8 serving to prevent the lever arm 4 from sliding down. This is preferably the third toe since this toe is a little longer and stronger but also e.g. the fourth toe could be used.

The adjustable arm 5 is connected to the main part of the brace by means of a sleeve 6. The sleeve 6 may be slid to a correct position in order to accommodate various sizes of big toes. When the sleeve 6 is positioned correctly it may be fixed with glue.

The brace is manufactured from stainless steel spring-wire, thickness e.g. 1,75 mm. The pads 2 and 3 are cup shaped pads, made of steel sheet, thickness e.g. 0,6 mm or injection moulded plastic. The adjustable sleeve 6 is also preferably made of stainless steel.

For best comfort the lever arm 4 may carry a silicone tube 7. The strap 8 is suitably made of rubber or plastic, but may also be made of leather, cotton or a hook and loop connection (Velcro® fastening).

The distal pad 3 may carry another strap or fastening means 9 to be located around the big toe and preventing the pad from sliding off. This strap 9 suitably comprises a hook and loop connection for easy fastening and adjustment.

The brace according to the invention can be used in a dynamic way. Since

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all correcting and stiff parts are located distally of the metatarsal joint the brace does not interfere with normal walking. The brace has a lever means with a clear three point working principle. A force A on the medial side moves the first phalanx laterally while a force B on the lateral side moves the distal end of the first phalanx and the toe medially. The reaction force C is applied against the soft tissue of the ball of the foot.

For the brace of the invention to be efficient the first metatarsal joint needs to be flexible enough to be repositioned and flexed in a horizontal plane. The patient should wear a shoe or slipper providing sufficient room for the medial movement of the toe.

The brace according to the invention is intended to be delivered as an "of the shelf" item and requires adjustments before it can be worn by a patient. Thus, the wire parts of the brace are bent for a proper fit. The sleeve 6 is positioned correctly and preferably glued to secure it to the wire. It is suitable that this work is performed by an orthotist/bandagist or possibly a podiatrist, even if patients eventually may learn to fit the braces themselves.

Thus, the present invention provides several advantages over the prior art. The brace allows for a dynamic treatment since the brace may be used at all times during walking, resting etc. and in normal shoes. The brace is adaptable for various foot sizes by means of some simple adjustments only. The brace is very light-weight and very comfortable.

A person skilled in the art will appreciate that the brace of the invention may be modified without departing from the scope of the invention. Thus, the embodiment shown is just given as an example of shapes and materials that may be used. The scope of the invention is only limited by the claims below.

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